

REMARKS

Claims 75 and 86-90 are canceled. Claims 21, 55, 71, 80, and 82-84 are amended. Claims 56-70, 72-74, 76-79, 81 and 91-94 are previously presented. Claims 22-29 and 34-39 are original. Claims 1-15, 16-18, 19-20, 30-33, 40-43, 44-54 and 85 are withdrawn. Claims 21-29, 34-39, 55-74, 76-84 and 91-94 are presented for examination. No new matter has been added.

Allowable Subject Matter

Applicant acknowledges Examiner's conclusion that claims 76-79 are allowable.

Applicant agrees that the features recited in the Examiner's Reasons for Allowance are not taught or suggested by the art of record, and that the allowed independent claim, claim 76, is distinguished from the cited prior art for at least the reasons stated in the Reasons for Allowance, which are sufficient for allowance of all claims depending therefrom. Applicant does not concede that the stated reasons are the only grounds for patentability of the allowed claims, that the features excluded from the Reasons for Allowance are taught or suggested by the art of record, or that all of the features are necessary for patentability of the allowed claims or other claims directed to the disclosed subject matter.

35 U.S.C. § 102

Claims 21-22, and 24-29 have been rejected under 35 U.S.C. § 102(e) as being anticipated by Paratore et al., U.S. Pat. 6,259,044 (Paratore).

Applicant discloses and claims a touch-sensitive input device having an exposed, continuous surface defining a planar area, and a grid of capacitive sense elements coextensive with the area of the exposed surface and responsive to engagement of the exposed surface by an operator to establish a position of said engagement on the exposed surface. The exposed surface varies in elevation across its planar area to form a series of tactile features.

Claim 21 has been amended to more clearly define the scope of that claim. According to claim 21, as amended, the exposed, continuous surface is permanently affixed to the grid of sense elements to form an integrated assembly. Thus, the aspect of the invention now recited in

claim 21 features a permanent and integral relationship between the exposed, continuous surface and the grid of sense elements.

Paratore describes a keypad-overlay that covers a keypad (e.g., of a hand-held electronic device) and protects the keys. The keypad-overlay includes a substantially planar web portion and a plurality of cover members integrally connected to the web portion. (Col. 3, lines 19-22). The cover members are positioned to extend over respective keys of the keypad. (Col. 3, lines 22-23).

Paratore neither teaches nor suggests an exposed, continuous surface that is permanently affixed to a grid of sense elements to form an integrated assembly. Rather, Paratore describes a *removable* protective cover for keypads that can be used, for example, to protect the keys “from dust, debris, water or the like that may be encountered during use ... [and] also provides a barrier layer over the keys ... that protects the key indicia ... from being rubbed off or excessively worn by an activating member, such as the operator's finger, during extended use ...” (See, e.g., col. 4, lines 28-35). According to Paratore, “the keypad-overlay ... is removably attached to the electronic device ... such that, if the keypad-overlay becomes worn, damaged, or otherwise needs to be changed, it can be quickly and easily replaced with a new keypad overlay ... [and,] [a]lternatively, when a different keypad-overlay ... is needed or desired, as an example, because the keypad-overlay has selected coloring or key indicia on the cover members ... the keypad-overlay can be removed and replaced in a very quick and efficient manner without substantial idle time for the hand-held electronic device.” (Col. 4, lines 41-50). Accordingly, Paratore does not disclose all of the features of claim 21, and, therefore, Applicant respectfully requests that this rejection be withdrawn. As claims 22 and 24-29 depend from claim 21, Applicants submit that claims 22 and 24-29 are allowable for at least the same reasons.

35 U.S.C. § 103

The Examiner has rejected claim 23 under 35 U.S.C. § 103(a) as being unpatentable over Paratore. As claim 23 depends from claim 21, Applicant presumes that this rejection is based upon the Examiner's interpretation of Paratore with respect to claims 21-22, and 24-29, and

submits that the features missing from Paratore with respect to claims 21-22, and 24-29 are also missing from dependent claim 23.

Furthermore, Applicant has not found, nor has the Examiner articulated, any motivation in Paratore that would have led a person of ordinary skill in the art to modify the keypad-overlay described in the Levy reference to provide "[an] exposed, continuous surface is permanently affixed to [a] grid of sense elements to form an integrated assembly," as covered by claim 21.

There is no motivation in Paratore that would have led a person of ordinary skill in the art to modify Paratore's keypad-overlay to provide such an integrated assembly. In fact, as mentioned above, Paratore explains that the keypad-overlay is "*removably* attached to the electronic device 10 such that, if the keypad-overlay becomes worn, damaged, or otherwise needs to be changed, it can be quickly and easily replaced with a new keypad-overlay. Alternatively, when a different keypad-overlay 12 is needed or desired, as an example, because the keypad-overlay has selected coloring or key indicia on the cover members 20, the keypad-overlay can be removed and replaced in a very quick and efficient manner without substantial idle time for the hand-held electronic device 10." (Col. 4, lines 28-50). As the Paratore reference offers no motivation to produce an exposed, continuous surface that is permanently affixed to a grid of sense elements to form an integrated assembly, as covered by claim 21, the Examiner's arguments regarding the modification of Paratore's keypad-overlay with respect to the features of claim 21 does not present a prima facie case of obviousness. Accordingly, Applicant requests that the rejection of claim 23 as obvious in view of Paratore be withdrawn.

Claims 34-39, 55-57, 80-84 and 91-94 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Philipp, U.S. 6,535,200 (Philipp) in view of Paratore.

Regarding claim 34, this claim is directed to an electronic device having a substrate carrying a first array of spaced apart, conductive trace elements and a flexible cover disposed above the substrate and carrying a second array of spaced apart, conductive trace elements. The first and second arrays together form a coordinate system, with the cover separated from the substrate by an array of resilient, collapsible elements and having an exposed, continuous

surface. The first and second arrays of trace elements also form a capacitive grid responsive to presence of a digit of an operator on the surface of the cover. An electronic circuit is adapted to sense a capacitive state of the grid and to determine a position of said digit upon the sensed capacitive state. Thus, according to the claimed configuration, the capacitive grid is formed from the respective arrays of trace elements carried by both the flexible cover and the substrate.

Neither reference teaches or suggests a capacitive grid formed from a first array of conductive trace elements carried by a substrate and a second array of conductive trace elements carried by a flexible cover disposed above the substrate.

Philipp or Paratore, whether taken alone or in combination, do not supply a teaching or suggestion that would have lead a person with ordinary skill in the art to apply the capacitive grid of the of the claimed invention to the keyboard of Philipp or the keypad-overlay of Paratore.

Philipp describes a computer pointing device including a capacitive sensor having a plurality of electrodes disposed adjacent a circuit board or other generally planar fixed support (e.g., Item 23, FIG. 1) or baseplate underlying the keyboard. (Col. 3, line 66-col. 4, line 3).

As acknowledged by the Examiner, Philipp does not even describe using a flexible cover disposed above a substrate. Office action of January 26, 2006, page 9. Furthermore, contrary to the claimed invention, Phillip describes a computer pointing device including a capacitive sensor having a plurality of electrodes *disposed adjacent a circuit board or other generally planar fixed support or base plate*. (col. 3, line 66-col. 4, line 3). In support of this rejection the Examiner references Fig. 4, and col. 10, lines 22-36 of Philipp; however, even this referenced portion of the cited prior art clearly describes a capacitive sensor made using "an array of patterned metallic electrodes ... *disposed on an insulating layer or substrate*." (Emphasis added).

The claimed configuration advantageously increases the capacitive variation measured in response to presence of a digit of an operator on the surface of the cover. (Specification, page 23, lines 14-16). As a finger (i.e., operator's digit) moves across the surface the device can measure parasitic capacitance variations, which, for example, can be used to provide coordinate location information. (Specification, page 23, lines 16-18). Applying pressure at position on the surface of the cover, i.e., causing the cover to deflect toward the substrate, causes a much greater

capacitance variation, because the traces of the capacitive array are displaced relative to each other. (Specification, page 23, lines 18-20). This high degree of capacitive change is of a different order than those measured by parasitic variation and therefore can be clearly distinguished from motion across the surface of the cover, as mentioned above. (Specification, page 23, lines 20-21). Thus, the claimed configuration provides for two measurement systems employed in concert. (Specification, page 23, lines 21-24).

The Examiner adds Paratore for teaching "a flexible cover (26) disposed above the substrate which is also separated by an array of resilient, collapsible elements and having an exposed, continuous surface" citing Fig. 2; col. 2, lines 11-24; col. 3, line 18-col. 4, line 27. (See office action of January 26, 2006, page 9). Even if one were to assume, without conceding, that this is proper characterization of the Paratore reference, Paratore still fails to provide the subject matter missing with respect to the primary reference. Specifically, Paratore does not disclose a capacitive grid formed from a first array of conductive trace elements carried by a substrate and a second array of conductive trace elements carried by a flexible cover disposed above the substrate. Thus, the teachings of Philipp and Paratore, taken alone or together, would not have motivated a person with ordinary skill in the art to use the capacitive grid of claim 34 with either the computer pointing device described by Philipp or the keypad-overlay described by Paratore.

Furthermore, assuming without conceding that a person of ordinary skill in the art would have been motivated to modify Philipp by combining Philipp with Paratore, there is no indication that the combination would have resulted in the electronic device of claim 34. The Examiner has asserted that a person of ordinary skill in the art would have been motivated to use Paratore's keypad-overlay with the computer pointing device of Philipp. (See Office Action of January 26, 2006, page 9). But the result of this combination still would have been a device that would not have included all of the features of claim 34. More specifically, the result would be a flexible cover disposed over an otherwise independently functional capacitive grid, as opposed to a flexible cover carrying an array of space apart conductive trace elements that forms part of a capacitive grid as in claim 34. In addition, there is no motivation to modify the keypad-overlay

of Paratore to include an array of conductive trace elements since Paratore describes a removable cover (overlay) and one would not want to remove portions of a capacitive grid. Therefore, Applicant respectfully requests that the rejections of claims 34-39 as unpatentable over Philipp in view of the Paratore be withdrawn.

Regarding claim 55, this claim is directed toward a keypad having a substrate carrying an array of sense elements arranged to change state in response to keypad operation, and a flexible cover disposed above the substrate and having an exposed surface defining an array of elevated key regions, with non-elevated key regions defined in interstices between adjacent elevated key regions, also has an array of discrete snap elements extending between the cover and the substrate and spacing the cover from the substrate.

Claim 55 has been amended to more clearly define the scope of the claimed invention. According to claim 55, as amended, the snap elements are each located between two adjacent elevated key regions and adapted to resiliently collapse as a non-linear response to local pressure against the exposed cover surface to provide tactile feedback in response to pressure against both elevated key regions and non-elevated key regions.

Neither reference teaches or suggests a keypad having a flexible cover disposed above a substrate, the cover having an exposed surface defining an array of elevated key regions, with non-elevated key regions defined in interstices between adjacent elevated key regions, the keypad also having an array of discrete snap elements extending between the cover and the substrate and spacing the cover from the substrate, wherein the snap elements are each located between two adjacent elevated key regions and adapted to resiliently collapse as a non-linear response to local pressure against the exposed cover surface to provide tactile feedback in response to pressure against both elevated key regions and non-elevated key regions.

Philipp or Paratore, whether taken alone or in combination, do not supply a teaching or suggestion that would have lead a person with ordinary skill in the art to apply the flexible cover and snap element configuration of the of the claimed invention to the keyboard of Philipp or the keypad-overlay of Paratore.

Philipp describes a computer pointing device having an integrated capacitive sensor. (Col. 3, lines 34-51). The pointing device is disposed under a computer keyboard and senses the presence of an object, such as a user's fingers, adjacent the keycaps (col. 4, lines 3-6) and can be used, for example, "to move a display indicator 12 ... about on [a] display 14." (col. 4, line -col. 5, line 3). According to Philip, "a preferred sensor comprises plurality of keycaps 18 ... of the conventional type wherein an upper portion of a key, e.g., a keycap 18, is movable along a line generally perpendicular to a fixed support 23." (Col. 6, lines 24-29). Philipp also describes that "In many keyboards, the moving keycaps communicate with respective momentary contact switches 21 disposed on the fixed surface 23 (e.g., a circuit board) by means such as an array of parallel (and generally vertical) plungers 30." (Col. 6, lines 37-41) With reference to FIG. 2, it is clear that Philipp is describing conventional plunger type tactile elements disposed directly beneath discrete keycaps of the keyboard.

Thus, not only does Philipp fail to describe or distinguish between elevated and non-elevated key regions, Philipp also fails to describe snap elements disposed between a flexible cover (which defines those key regions) and a substrate, and positioned such that the user is provided with a tactile feedback in response to pressure against both elevated key regions and non-elevated key regions, as in the claimed configuration.

Furthermore, as acknowledged by the Examiner, Philipp does not describe using a flexible cover disposed above a substrate. Office action of January 26, 2006, page 9. The Examiner adds Paratore for teaching "a flexible cover (26) disposed above the substrate which is also separated by an array of resilient, collapsible elements and having an exposed, continuous surface" citing Fig. 2; col. 2, lines 11-24; col. 3, line 18-col. 4, line 27. (See office action of January 26, 2006, page 9).

However, Paratore still fails to provide the subject matter missing with respect to the primary reference. Specifically, Paratore does not disclose a keypad having a flexible cover disposed above a substrate, the cover having an exposed surface defining an array of elevated key regions, with non-elevated key regions defined in interstices between adjacent elevated key regions, the keypad also having an array of discrete snap elements extending between the cover

and the substrate and spacing the cover from the substrate, wherein the snap elements are each located between two adjacent elevated key regions and adapted to resiliently collapse as a non-linear response to local pressure against the exposed cover surface to provide tactile feedback in response to pressure against both elevated key regions and non-elevated key regions. Rather, Paratore describes a keypad-overlay that includes a web and a plurality of cover members projecting away from the web portion so that each cover member is positionable over a selected key (i.e., of an underlying keypad). (Col. 1, line 65-col. 2, line 3; *see also*, e.g., col. 3, lines 18-26). The cover members, in some cases (e.g., when used with a touch-sensitive screen), provide tactile feedback to the operator to let the operator know when a respective key has been actuated. (Col. 5, lines 25-29). However, there is no teaching or suggestion in Paratore of a flexible cover defining *both* elevated and non-elevated key regions, or an array of discrete snap elements that space the cover from an underlying substrate and also provide tactile feedback in response to both elevated and non-elevated key region actuation.

Thus, the teachings of Philipp and Paratore, taken alone or together, would not have motivated a person with ordinary skill in the art to use the flexible cover and snap element configuration of claim 55 with either the computer pointing device described by Philipp or the keypad-overlay described by Paratore.

Therefore, Applicant respectfully requests that the rejections of claims 55-70, 91 and 92 as unpatentable over Philipp in view of the Paratore be withdrawn.

Regarding claim 71, this claim has been amended to more clearly define the scope of the claimed invention. As amended, claim 71 recites, in pertinent part "an array of discrete snap elements extending between the cover and the substrate and spacing the cover from the substrate, the snap elements each located between two adjacent elevated key regions and adapted to resiliently collapse ... as a non-linear response to local pressure against the exposed cover surface, wherein the snap elements are arranged to provide a substantially equal tactile feedback in response to pressure against both elevated and non-elevated key regions." Thus, for at least

the reasons stated above with respect to claim 55, claim 71 recites features neither taught nor suggested by the cited prior art references.

Therefore, Applicant respectfully requests that the rejections of claims 71-74 as unpatentable over Philipp in view of the Paratore be withdrawn. Claims 75 has been canceled, and as such, the rejection is now moot with respect to claim 75.

Regarding claim 80, this claim is directed to a keypad having a substantially planar substrate carrying an array of sense elements arranged to change state in response to keypad operation, and a flexible cover disposed above the substrate. The cover has an exposed surface defining an array of elevated key regions arranged in rows and columns, with non-elevated key regions between adjacent elevated key regions, and a back surface facing the substrate and held away from the substrate by collapsible snap elements between the cover and substrate. The back surface carries an array of conductive pills located beneath corresponding elevated key regions, with each conductive pill having a contact surface facing the substrate that has outer regions that slope away from the substrate.

The Examiner has not proposed, nor does the Applicant find, any teaching or suggestion of a flexible cover having a back surface that carries an array of conductive pills, as recited in claim 80, in either of the cited prior art references. In support of the rejection of this claim, the Examiner relies on the reasons for rejection stated with respect to claim 55 (office action of January 26, page 10: "Claims 71 and 80 are essentially similar to claim 55 and are rejected for the same reasons stated above"); however, claim 55 does not include this claim feature and it is not otherwise addressed.

It would not have been obvious to a person having ordinary skill in the art to modify Philipp or Paratore to utilize a flexible cover having a back surface defining an array of conductive pills as in the claimed configuration.

Philipp describes keyboards having movable keycaps that communicate with respective momentary contact switches disposed on a fixed surface, e.g., printed circuit board, positioned below the keycaps by means such as an array of parallel (and generally vertical) plungers. (Col.

6, lines 37-41). Philipp also describes "other keyboards" that include "non-contact position sensing means (e.g., a Hall effect device or a dedicated capacitive sensor) [which] are used instead of a switch comprising two metal contacts." (Col. 6, lines 41-45).

However, Philipp does not describe a flexible cover having a back surface defining an array of conductive pills as in claim 80. With the claimed configuration, by sloping the distal regions of the contact surfaces of the pills they may be made larger and therefore provide more reliable operation, i.e., to account and adjust for inaccuracies due to bending of the flexible cover, and inaccuracies inherent in normal use. (*See*, e.g., Specification at page 26, line 16-page 27, line 11).

Paratore, as discussed above, describes a keypad-overlay having a web and a plurality of cover members projecting from the web, each cover member positioned over a selected key of a keypad, (col. 1, line 67-col. 2, line 3). However, Paratore fails to provide the subject matter missing with respect to the Philipp reference. Specifically, Paratore does not describe a flexible cover having a back surface defining an array of conductive pills, each conductive pill having a contact surface facing the substrate that has outer regions that slope away from the substrate. Thus, the teachings of Philipp and Paratore, taken alone or together, would not have motivated a person with ordinary skill in the art to use a flexible cover having a back surface defining an array of conductive pills as in the claimed configuration with the keyboard of Philipp or the keypad-overlay of Paratore.

Therefore, Applicant respectfully requests that the rejections of claims 80-84, 93 and 94 as unpatentable over Philipp in view of the Paratore be withdrawn.

CONCLUSION

Applicants submit that this application is now in condition for allowance. Early favorable action is solicited.

Enclosed is a check for \$225 for the Petition for Extension of Time fee. Please apply any other charges or credits to deposit account 06-1050, referencing attorney docket number 13159-002001.

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Serial No. : 09/862,948
Filed : May 22, 2001
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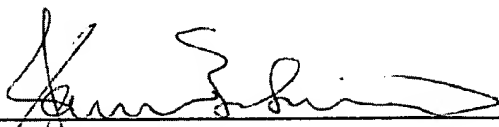
Attorney's Docket No.: 13159-002001

Respectfully submitted,

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